

What is claimed is:

1. A silicon carbide fiber having a boron nitride layer in a fiber surface and having the following properties of a
5 to c,

a. the existent ratio of boron slopingly increases towards the surface of the fiber,

b. the existent ratio of boron in the region of from the fiber surface to a depth of 500 nm is 0.5 to 1.5 % by weight,

10 c. the existent ratio of boron in a fiber central portion which is a region of a depth of at least 3 μ m below the fiber surface is 0 to 0.2 % by weight.

2. A silicon carbide fiber according to claim 1, wherein
15 the existent ratio of boron is 0.2 to 1.5 % by weight based on the fiber as a whole.

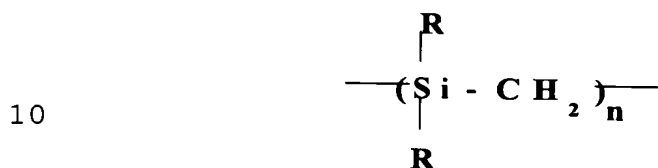
3. A silicon carbide fiber according to claim 1, which is formed of a composite phase comprising a silicon carbide
20 phase and a boron nitride phase.

4. A silicon carbide fiber according to claim 3, wherein the amount of the silicon carbide phase is 97 % by weight or more based on the fiber as a whole.
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5. A silicon carbide fiber according to claim 1, wherein a layer in which the existent ratio of the boron slopingly increases exists in the range of from 5 to 500 nm below the surface of the fiber.
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6. A process for the production of a silicon carbide fiber recited in claim 1, which process comprises

melt-spinning a modified polycarbosilane obtainable by modifying a polycarbosilane having a main chain structure represented by the formula,



(in which R is a hydrogen atom, a lower alkyl group or a phenyl group) and a number average molecular weight of 200 to 7,000, with an organic boron compound or melt-spinning a mixture of the modified polycarbosilane and an organic boron compound, to obtain a spun fiber;

infusibilizing the spun fiber; and
sintering the infusible fiber in a
20 nitrogen-containing atmosphere.

7. A process according to claim 6, wherein the organic boron compound is a compound having a basic structure of the formula $\text{B}(\text{OR}')_n$ or the formula BR''_m , in which R' is an alkyl group having 1 to 20 carbon atoms or a phenyl group, R'' is acetyl acetate, and each of m and n is an integer of more than 1.

8. A process according to claim 6, wherein at least part of silicon atoms of the polycarbosilane bond to metal atoms selected from the group consisting of Ti, Zr, Hf, Al, V, Mg and Y directly or through oxygen atoms.

9. A process according to claim 6, wherein the organic boron compound bonds to the polycarbosilane as a monofunctional polymer.